

Application No.: 10/716346
Docket No.: CL2221USNA

Page 5

REMARKS

Claims 1-27 are in the case. Claims 1-20 are withdrawn. Claims 21-27 are under presently consideration in the case.

Claim 21 has been amended to more clearly define Applicants' invention.

All claims remain rejected under 35 USC § 112, 103 and the judicially created doctrine of double patenting.

No new matter has been added.

Status of the Case

Applicants gratefully acknowledge the entry of the amendment filed 8 September 2005 and the withdrawal of previous rejections made under 35 USC § 103.

Claim Rejections – 35 USC § 112, first paragraph

Claims 25 and 26 are rejected under 35 USC § 112 as failing to comply with the written description requirement. Specifically the examiner finds no basis in the specification for the limitation in claim 25 that the carbon nanotube (CNT) lacks a member of a binding pair. The examiner suggests that whereas as the specification teaches the presence of a binding pair on the CNT that no instances of the CNT lacking a binding pair may be found. Applicants respectfully traverse.

Examples 1-7 teach the use of nucleic acids as dispersants for the dispersion of single walled carbon nanotubes. Neither the CNT nor the nucleic acids possess a member of a binding pair. It should be noted here that the discussion of the use of binding pairs is limited to the incorporation of binding pairs into the nucleic acids that are non-covalently associated with the CNT and not on the CNT itself. These discussions are found at page 11 beginning at line 1.

In view of the support cited in the specification applicants submit that the claims as previously amended meet 35 USC § 112, first paragraph and do not introduce new matter into the specification.

Claim Rejections – 35 USC § 112, second paragraph

Claims 21-27 are rejected under 35 USC § 112, second paragraph for indefiniteness. In particular the examiner finds the use of the phrase "dispersed" in claim 21 unclear and finds the "CNT" as used in claim 25 and 26 lacks antecedent basis in the carbon nanotube of line 1.

As to the use of the term "dispersed" in claim 21: Applicants submit the term is clear. A dispersed complex is one that is not associated with another similar complex.

As to the lack of antecedent basis in the carbon nanotube of the term CNT of claim 25, the claim has been amended to overcome this rejection.

Application No.: 10/716346
Docket No.: CL2221USNA

Page 6

Claim Rejections – 35 USC § 103

Claims 21-24 and 27 are rejected under 35 USC § 103(a) as being unpatentable over Guo et al (Adv. Mat., 1998 10(9): 701, hereinafter “Guo” in view of O’connell et al (Chem.Phys.Lett 342, 265-271) herein after “O’connell”.

The teachings of Guo have been given in previous office actions.

O’connell is cited for teaching the wrapping of single walled CNT’s with linear polymers.

The examiner is of the opinion that, because Guo teaches the noncovalent association of a nucleic acid with a CNT of unspecified morphology, that the skilled person would find the present invention (single walled CNT non-covalently associated with nucleic acids) obvious in view of linear polymer wrapped CNT of O’connell. Applicants respectfully traverse.

It is well settled that in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143

Applicants submit that the cited art fails to establish a *prima facie* case of obviousness as the combination of the cited references would not give the skilled practitioner a reasonable expectation of success and that the prior art references do not teach all the limitations of the claimed invention.

Guo teaches double stranded, self complementary nucleic acids that comprise introduced heavy atoms (see page 701, second column). The claimed invention is limited to single stranded nucleic acids. O’connell teaches the dispersion of SWCT with linear polymers comprised of polyvinyl pyrrolidone and polystyrene sulfonate. The binding behavior of double stranded DNA and single stranded DNA is very different and the skilled artisan would not reasonably conclude that adhesion by the double stranded nucleic acids of Guo would be transferable to the single stranded nucleic acids of the invention. Similarly, the binding properties of the linear polymers of O’connell, are vastly different than those of the single stranded DNA, and the skilled person would have no reason based in technical fact to assume that the association of a synthetic polymer with a CNT would teach anything about the association of a single stranded nucleic acid with a CNT. For these reasons Applicant’s submit that the skilled person would have no reasonable expectation of success in combining the teachings of the cited references.

Additionally, the cited references do not teach all the limitations of the invention as claimed. The invention of claim 21 is clearly limited to single stranded nucleic acids. Neither Guo nor O’connell teach the association of single stranded nucleic acids with CNT’s. Since

Application No.: 10/716346
Docket No.: CL2221USNA

Page 7

the combination of references do not teach all the limitations of the invention as claimed they cannot form the basis for a *prima facie* case of obviousness under 35 USC § 103(a).

Claims 21-27 are rejected under 35 USC § 103(a) as being unpatentable over Massey et al (US 5866434), hereinafter "'434", in view of O'connell.

The teaching of O'connell has been given above

'434 is cited for teaching the association of biotinylated DNA with an avidin coated CNT. '434 does not teach the direct, unmediated binding of a nucleic acid to an unfunctionalized CNT.

The examiner argues that the teaching by '434 of the non-covalent association of the DNA with the CNT in combination with the teaching of O'connell of linear polymer wrapped CNT's renders the present claims obvious to the skilled person. Applicants respectfully traverse.

The arguments made above in rebuttal to the rejection under 325 USC § 103(a) of claims 21-24 and 27 are relevant here and are hereby incorporated by reference. As has been noted previously, the teaching of '434 with respect to association of the DNA with the CNT is limited to situations where the CNT is functionalized with a member of a binding pair (Column 40, lines 41-50). Claim 21 has been amended to recite the limitation that the CNT is unfunctionalized. Basis for this amendment is found on page 3, line 16 and in the examples: Because the combined references do not teach an unfunctionalized CNT associated with a single stranded nucleic acid by non-covalent means all of the elements of the invention are not taught and a *prima facie* case of obviousness cannot be made.

Claims 21-25 and 27 are rejected under 35 USC § 103(a) as being unpatentable over Tsang et al (Angew, Chem Int., 1997, 36 (20):2198-2200), hereinafter "Tsang", in view of O'connell.

The teaching of O'connell has been stated above.

Tsang is cited for teaching DNA adsorbed on the surface of a CNT. Tsang is silent with respect to whether the CNT is single walled or multiwalled. Tsang do not disclose the use of single stranded nucleic acids.

The examiner argues as above that the teaching of Tsang of the non-covalent association of the DNA with the CNT in combination with the teaching of O'connell of linear polymer wrapped CNT's makes the present claims obvious. Applicants respectfully traverse.

The arguments made above in rebuttal to the rejection under 325 USC § 103(a) of claims 21-24 and 27 are relevant here and are hereby incorporated by reference. As with Guo, Tsang teach only double stranded DNA (see reference to "DNA duplex, page 2198, end of first column). As noted above, the binding behavior of single and double stranded nucleic acids is different and one cannot inform the other. Additionally, as noted above, since single

Application No.: 10/716346
Docket No.: CL2221USNA

Page 8

stranded nucleic acids are not taught in either reference the combination of references does not teach all the limitations of the claims.

Double Patenting

Claims 21-23 and 25-27 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 14 and 19 of co-pending application USSN 10/716347. The examiner maintains the view that although the claims are not identical that they are not patentable distinct.

Applicants maintain the position that the present claims are drawn to a single complex where as the conflicting claims are drawn to a population of complexes and are therefore patentably distinct.

The timely filing of a terminal disclaimer is sufficient to overcome this rejection. However, where the second application has not yet been allowed the examiner has an obligation to withdraw the double patenting rejection at the time when that rejection is the only one remaining the case.

The "provisional" double patenting rejection should continue to be made by the examiner in each application as long as there are conflicting claims in more than one application unless that "provisional" double patenting rejection is the only rejection remaining in one of the applications. If the "provisional" double patenting rejection in one application is the only rejection remaining in that application, the examiner should then withdraw that rejection and permit the application to issue as a patent, thereby converting the "provisional" double patenting rejection in the other application(s) into a double patenting rejection at the time the one application issues as a patent.

If the "provisional" double patenting rejections in both applications are the only rejections remaining in those applications, the examiner should then withdraw that rejection in one of the applications (e.g., the application with the earlier filing date) and permit the application to issue as a patent. The examiner should maintain the double patenting rejection in the other application as a "provisional" double patenting rejection which will be converted into a double patenting rejection when the one application issues as a patent. [MEPE 804 IB]

Filing a terminal disclaimer at this time where the disposition of the allegedly conflicting claims is unknown, would potentially unnecessarily limit the term of the present application. Accordingly no terminal disclaimer is filed at this time.

Application No.: 10/716346
Docket No.: CL2221USNA

Page 9

In view of the foregoing arguments Applicants respectfully request reconsideration of the claims as amended and removal of all rejections.

Respectfully submitted,



S. NEIL FELTHAM
ATTORNEY FOR APPLICANTS
Registration No.: 36,506
Telephone: (302) 992-6460
Facsimile: (302) 992-5374

Dated: March 23, 2006